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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/939,767	08/28/2001	Shunpei Yamazaki	740756-2358	3748

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EXAMINER	
HOGANS, DAVID L	
ART UNIT	**PAPER NUMBER**
2813	

DATE MAILED: 06/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/939,767	YAMAZAKI, SHUNPEI	
	Examiner	Art Unit	
	David L. Hogans	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-7 and 35-61* is/are pending in the application.

4a) Of the above claim(s) *62-73* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-7 and 35-61* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/094,345.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Remarks filed on March 18, 2004.

Status of Claims

Claims 1-3, 5-7 and 35-61 are pending. Claims 4 and 8-34 are cancelled.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 408213317 to Yamazaki et al.

Claims 1, 3 and 6

Yamazaki et al. teaches: a silicon active layer containing a nickel catalytic element for promoting crystallization (See paragraphs 10-45 of translation and Figures 1-6); a gate insulating film (408) interposed between a heat resistant gate electrode (407) and the active layer (See paragraphs 10-45 of translation and Figures 1-6); and wherein a nickel concentration in the source/drain regions is at least one order of magnitude higher than a concentration of nickel in other regions (See paragraphs 10-45 of translation and Figures 1-6; further noting that paragraph [0029] teaches later processing steps that reduces the concentration of nickel in the channel by ½ or more)

Yamazaki et al. fails to explicitly teach wherein the nickel concentration in the source/drain regions is higher than a concentration of nickel in other regions by two or more orders of magnitude.

However, Yamazaki et al., in paragraphs 10-45 of translation and Figures 1-6, teaches a nickel concentration in the source/drain regions that is at least one order of magnitude higher than a concentration of nickel in other regions. Furthermore, Yamazaki et al. teaches that a later processing step reduces the concentration of nickel in the channel by ½ or more. Finally, Yamazaki et al. teaches that by lowering the concentration of nickel in the channel, a crystalline stabilized high speed TFT can be obtained.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to create a channel region with a nickel concentration of two orders of magnitude less than the source/drain regions to design a crystalline stabilized high speed TFT, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955)

Furthermore, the specification contains no disclosure of either the critical nature of the claimed arrangement (i.e. - a channel region with a crystallization promoting material concentration of two orders of magnitude less than the crystallization promoting

material in the source/drain regions) or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a claim, the Applicant must show that the chosen limitations are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990)

Claim 5

Incorporating all arguments of Claim 1 and noting that the semiconductor device is selected from the group consisting of a portable intelligent terminal, a head mounted display, a front projection type liquid crystal display, a cellular mobile telephone, a portable video camera, and a rear projection liquid crystal display (See paragraphs 10-45 of translation and Figures 1-6)

3. Claims 2, 7 and 54-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 408213317 to Yamazaki et al. (hereinafter "JP") in view of 5,459,090 to Yamazaki et al.

Claims 2, 7 and 54-56

Incorporating all arguments of Claim 1 and noting that JP fails to explicitly teach a gate electrode comprised by a tantalum.

However, Yamazaki et al., in column 8 lines 1-10, teaches a gate electrode comprised by tantalum (melting point of 2985 °C). Further, Yamazaki, in column 8 lines

10-15, notes that refractory metals, such as tantalum, are commonly employed because they offer lower resistivities.

It would have been obvious to one of ordinary skill in the art to modify JP by incorporating a gate electrode comprised by tantalum, as taught by Yamazaki et al., to lower the resistivity of the gate electrode.

Claim 57

Incorporating all arguments of Claims 1 and 54 and noting that JP, in paragraphs 10-45 of translation and Figures 1-6, teaches wherein the semiconductor device is selected from the group consisting of a portable intelligent terminal, a head mounted display, a front projection type liquid crystal display, a cellular mobile telephone, a portable video camera, and a rear projection liquid crystal display.

4. Claims 35-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 408213317 to Yamazaki et al. (hereinafter "JP") in view of 5,459,090 to Yamazaki et al. in view of 5,764,321 to Koyama et al.

Claims 35, 37 and 40-41

Incorporating all arguments of Claim 1 and noting that JP teaches: a silicon active layer containing a nickel catalytic element for promoting crystallization (See paragraphs 10-45 of translation and Figures 1-6); a gate insulating film (408) interposed

between a gate electrode (407) and the active layer (See paragraphs 10-45 of translation and Figures 1-6); and wherein a nickel concentration in the source/drain regions is at least one order of magnitude higher than a concentration of nickel in other regions (See paragraphs 10-45 of translation and Figures 1-6; further noting that paragraph [0029] teaches later processing steps that reduces the concentration of nickel in the channel by ½ or more)

JP fails to explicitly teach first and second insulating layers placed over the device.

However, Koyama et al., in Figure 3D and column 4 lines 61-68, teaches a laminate structure (311) of silicon nitride and polyimide. Finally, Koyama et al. teaches that this structure (311) acts as an interlayer insulating film.

It would have been obvious to one of ordinary skill in the art to modify JP by incorporating a silicon nitride and polyimide laminate, as taught by Koyama et al., to protect the devices formed underneath by providing an interlayer insulating film.

Claim 39

Incorporating all arguments of Claim 35 and noting that JP, in paragraphs 10-45 of translation and Figures 1-6, teaches wherein the semiconductor device is selected from the group consisting of a portable intelligent terminal, a head mounted display, a

front projection type liquid crystal display, a cellular mobile telephone, a portable video camera, and a rear projection liquid crystal display.

Claims 36 and 38

Incorporating all arguments of Claim 35 and noting that JP fails to explicitly teach a gate electrode comprised by a tantalum.

However, Yamazaki et al., in column 8 lines 1-10, teaches a gate electrode comprised by tantalum (melting point of 2985 °C). Further, Yamazaki, in column 8 lines 10-15, notes that refractory metals, such as tantalum, are commonly employed because they offer lower resistivities.

It would have been obvious to one of ordinary skill in the art to modify JP by incorporating a gate electrode comprised by tantalum, as taught by Yamazaki et al., to lower the resistivity of the gate electrode.

5. Claims 42, 44 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 408213317 to Yamazaki et al. (hereinafter "JP") in view of 5,426,064 to Zhang et al.

Claims 42 and 44

JP teaches: a silicon active layer containing a nickel catalytic element for promoting crystallization (See paragraphs 10-45 of translation and Figures 1-6); a gate

insulating film (408) interposed between a gate electrode (407) and the active layer (See paragraphs 10-45 of translation and Figures 1-6); and wherein a nickel concentration in the source/drain regions is at least one order of magnitude higher than a concentration of nickel in other regions (See paragraphs 10-45 of translation and Figures 1-6; further noting that paragraph [0029] teaches later processing steps that reduces the concentration of nickel in the channel by ½ or more)

Yamazaki et al. fails to explicitly teach wherein the nickel concentration in other regions of the active layer is less than $5x10^{16}$ atoms/cm^3.

However, Zhang et al., in column 1 lines 52-68, teaches that $1x10^{17}$ atoms/cm^3 of nickel is needed in an amorphous layer to promote crystallization of silicon. The Examiner notes that JP teaches the concentration of nickel can be reduced by ½ or more in the channel and that ½ times $1x10^{17}$ equals $0.5x10^{17}$ or $5x10^{16}$.

It would have been obvious to one of ordinary skill in the art to modify JP by incorporating a channel region with less than $5x10^{16}$ atoms/cm^3 of nickel, as taught by Zhang et al., because a channel with a region of $1x10^{17}$ atoms/cm^3 of nickel promotes crystallization of an amorphous layer.

Furthermore, the specification contains no disclosure of either the critical nature of the claimed arrangement (i.e. - a channel region with less than $5x10^{16}$ atoms/cm^3 of

crystallization promoting material) or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a claim, the Applicant must show that the chosen limitations are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990)

Claim 46

Incorporating all arguments of Claim 42 and noting that JP, in paragraphs 10-45 of translation and Figures 1-6, teaches wherein the semiconductor device is selected from the group consisting of a portable intelligent terminal, a head mounted display, a front projection type liquid crystal display, a cellular mobile telephone, a portable video camera, and a rear projection liquid crystal display.

6. Claims 43, 45 and 58-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 408213317 to Yamazaki et al. (hereinafter "JP") in view of 5,426,064 to Zhang et al. in view of 5,459,090 to Yamazaki et al.

Claims 43, 45 and 58-60

Incorporating all arguments of Claim 42 and noting that JP and Zhang et al. fail to explicitly teach a gate electrode comprised by a tantalum.

However, Yamazaki et al., in column 8 lines 1-10, teaches a gate electrode comprised by tantalum (melting point of 2985 °C). Further, Yamazaki, in column 8 lines

10-15, notes that refractory metals, such as tantalum, are commonly employed because they offer lower resistivities.

It would have been obvious to one of ordinary skill in the art to modify JP and Zhang et al. by incorporating a gate electrode comprised by tantalum, as taught by Yamazaki et al., to lower the resistivity of the gate electrode.

Claim 61

Incorporating all arguments of Claim 58 and noting that JP, in paragraphs 10-45 of translation and Figures 1-6, teaches wherein the semiconductor device is selected from the group consisting of a portable intelligent terminal, a head mounted display, a front projection type liquid crystal display, a cellular mobile telephone, a portable video camera, and a rear projection liquid crystal display.

7. Claims 47, 49 and 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 408213317 to Yamazaki et al. (hereinafter "JP") in view of 5,426,064 to Zhang et al. in view of 5,764,321 to Koyama et al.

Claims 47, 49 and 52-53

Incorporating all arguments of Claim 42 and noting that JP teaches: a silicon active layer containing a nickel catalytic element for promoting crystallization (See paragraphs 10-45 of translation and Figures 1-6); a gate insulating film (408) interposed

between a gate electrode (407) and the active layer (See paragraphs 10-45 of translation and Figures 1-6); and wherein a nickel concentration in the source/drain regions is at least one order of magnitude higher than a concentration of nickel in other regions (See paragraphs 10-45 of translation and Figures 1-6; further noting that paragraph [0029] teaches later processing steps that reduces the concentration of nickel in the channel by ½ or more)

JP and Zhang et al. fail to explicitly teach first and second insulating layers placed over the device.

However, Koyama et al., in Figure 3D and column 4 lines 61-68, teaches a laminate structure (311) of silicon nitride and polyimide. Finally, Koyama et al. teaches that this structure (311) acts as an interlayer insulating film.

It would have been obvious to one of ordinary skill in the art to modify JP and Zhang et al. by incorporating a silicon nitride and polyimide laminate, as taught by Koyama et al., to provide an interlayer insulator.

Claim 51

Incorporating all arguments of Claim 47 and noting that JP, in paragraphs 10-45 of translation and Figures 1-6, teaches wherein the semiconductor device is selected from the group consisting of a portable intelligent terminal, a head mounted display, a

front projection type liquid crystal display, a cellular mobile telephone, a portable video camera, and a rear projection liquid crystal display.

8. Claims 48 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 408213317 to Yamazaki et al. (hereinafter "JP") in view of 5,426,064 to Zhang et al. in view of 5,459,090 to Yamazaki et al. in view of 5,764,321 to Koyama et al.

Claims 48 and 50

Incorporating all arguments of Claim 47 and noting that JP and Zhang et al. and Koyama et al. fail to explicitly teach a gate electrode comprised by a tantalum.

However, Yamazaki et al., in column 8 lines 1-10, teaches a gate electrode comprised by tantalum (melting point of 2985 °C). Further, Yamazaki, in column 8 lines 10-15, notes that refractory metals, such as tantalum, are commonly employed because they offer lower resistivities.

It would have been obvious to one of ordinary skill in the art to modify JP and Zhang et al. and Koyama et al. by incorporating a gate electrode comprised by tantalum, as taught by Yamazaki et al., to lower the resistivity of the gate electrode.

Response to Arguments

9. Applicant's arguments filed March 18, 2004, have been fully considered but they are not persuasive.

Claims 1, 3, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 408213317 to Yamazaki et al.

Applicant proffers that: 1) the prior art fails to teach or suggest "a heat resistant gate electrode (407)", or 2) a "a nickel concentration in the source/drain regions that is at least one order of magnitude higher than a concentration of nickel in other regions".

Initially, in support of the proposition that the prior art fails to teach or suggest "a heat resistant gate electrode (407)", Applicant's representative offers the following evidence:

"Yamazaki '317 teaches using aluminum to form the gate electrode 407. As noted in Yamazaki '317, aluminum diffuses from the gate electrode 407 at a temperature of 450 $^{\circ}$C or more (see paragraph [0029]). As such, a heat-treatment process in Yamazaki '317 "cannot be performed at the temperature of 450 degrees C or more" (Id.). This citation shows that the gate electrode of Yamazaki '317 is not a heat resistant gate electrode. In contrast, according to the specification of the present application, gate electrodes made of tantalum and titanium are examples of heat resistant gate electrodes (see page 2, lines 26-27 and page 6, lines 5-7). A heat resistant gate electrode in the present application means, for example, a gate electrode made of a material which has almost the same heat resistance as or more heat resistance than tantalum or titanium. Therefore, Yamazaki '317 does not teach or suggest a heat resistant gate electrode, as characterized by the specification and claims of the present invention."

The Examiner notes that MPEP § 2111 provides that "[D]uring patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." In re Hyatt, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969)" Against this backdrop, MPEP § 2111.01 provides that "[W]hile the ** claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)". (emphasis added)

According to Merriam-Webster's Collegiate Dictionary (2001) (Tenth Edition) heat is defined as "to become warm or hot". Furthermore, Merriam-Webster's Collegiate Dictionary (2001) (Tenth Edition) defines resistant as "giving or capable of resistance". Finally, Merriam-Webster's Collegiate Dictionary (2001) (Tenth Edition) defines resistance as "an opposing or retarding force". It necessarily follows that Merriam-Webster's Collegiate Dictionary (2001) (Tenth Edition) provides the following plain

meaning definition of heat resistance: giving or capable of opposing or retarding warmth. As the gate electrode of '317 is capable of opposing or retarding warmth (i.e. – it requires energy to be input into the gate electrode to raise its temperature), it is a heat resistant material. The examiner interprets applicant's claim language accordingly, to reduce the possibility that the claim, once issued, will be interpreted more broadly than is justified.

Next, Applicant intimates that gate electrodes comprised by a heat resistant material of Applicant's Claim 1, must be comprised by tantalum or titanium. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., gate electrodes comprised by a heat resistant material must be comprised by tantalum or titanium) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Finally, Applicant does not provide a concrete definition of what comprises a heat resistant material. For instance, Applicant's specification at page 2 lines 26-27 provides that "[T]antalum or a material mainly comprising tantalum can be used as the heat-resistant material described above". (emphasis added) Merriam-Webster's Collegiate Dictionary (2001) (Tenth Edition) defines can as "used to indicate possibility". Such equivocating type of language cannot be afforded the force of a definition because the

heat resistant material need not be comprised by tantalum but may possibly be comprised by other materials.

Secondly, Applicant proffers that the prior art fails to teach "a nickel concentration in the source/drain regions that is at least one order of magnitude higher than a concentration of nickel in other regions". The Examiner notes that paragraph 20 of '317 teaches wherein a channel region can have a concentration of $1x10^{18}cm^{-3}$ or less of the metallic element and the source/drain regions may be $5x10^{19}cm^{-3}$ of the metallic element. (emphasis added) Furthermore, the Examiner notes that paragraph 29 of '317 teaches wherein the concentration of nickel in the channel region may be reduced by ½ or more. For instance, multiplying a channel concentration of $1x10^{18}$ by ½ (or less) gives a value of $0.5x10^{18}$ or $5x10^{17}$ (or less), a difference of at least one order of magnitude or more. The Examiner finds it of note that the only reference to wherein a concentration of said crystallization promoting material in a source region and a drain region formed in said active layer is higher than a concentration of said crystallization promoting material in other regions in said active layer by two or more orders of magnitude is on page 3 lines 1-7 of Applicant's specification (i.e. – in the summary of the invention). Missing from this disclosure is probative evidence of the value of this discovery. For instance, the Examiner notes that the record fails to provide criticality as to the limitation of two or more orders of magnitude. The Examiner notes that the only reference to such limitation is "[t]he characteristics and reliability of the finished TFT's can be enhanced". See Applicant's specification at page 3 lines 6-7. Even taken in

context, this sentence, at best, provides a generic description as to the importance of lowering the catalytic element concentration in the channel region. It does not suggest the basis for Applicant's invention (i.e. – that a difference of two or more orders of magnitude provide superior results). Finally, the Examiner notes the lack of evidence upon the record contrasting wherein a difference of two or more orders of magnitude is superior to a difference of one or more orders of magnitude, as taught by the '317 patent to the same inventor; as this type of evidence would seem to logically support the Applicant's proffered invention.

Claims 2, 7 and 54-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamazaki '317 and U.S. Patent No. 5,459,090 to Yamazaki et al.

The crux of Applicant's argument centers around the notion that it would have not been obvious to one of ordinary skill in the art to modify (Yamazaki '317) by incorporating a gate electrode comprised by tantalum, as taught by (Yamazaki '090), to lower the resistivity of the gate electrode. In support of this conclusion, Applicant's representative offers the following evidence: "[I]n fact, it is well known that the resistivity of aluminum is lower than that of tantalum (see attached Table 4.2.1.1, "electric resistivity of metal at room temperature," American Institute of Physics (AIP) Handbook 3rd Ed. 9 (1972) 39, McGraw-Hill). As such, Yamazaki '090 teaches away from the alleged motivation suggested by the Official Action." The Examiner refers Applicant to paragraph 34 of the '317 reference wherein it teaches that the gate electrode may be

comprised by a silicide. For Applicant's convenience, the Examiner provides a copy of Silicon Processing for the VLSI Era (Volume 2) by Wolf et al., page186 Table 4.1, which teaches that Tantalum has a lower resistivity than most common silicides. Therefore, it would have been obvious to one or ordinary skill in the art at the time of the invention to combine Yamazaki '317 with Yamazaki '090 to replace a higher resistivity silicide gate electrode with a lower resistivity tantalum gate electrode.

Claims 35-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamazaki '317, U.S. Patent No. 5,459,090 to Yamazaki et al. and U.S. Patent No. 5,764,321 to Koyama et al.

The Applicant proffers that Koyama et al. fails to cure the deficiencies of Yamazaki '317 and Yamazaki '090. The Examiner refers Applicant to the above arguments.

Claims 42, 44 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamazaki '317 and U.S. Patent No. 5,426,064 to Zhang et al.

The Applicant argues that "claim 42 recites a concentration of a crystallization promoting material of less than $5x10^{16}$ atoms/cm^3. In contrast, Zhang teaches that "if the concentration of [catalytic metal] elements is in excess of $1x10^{17}$ cm^{-3}, favorable results are obtained" (column 1, lines 62-65). Therefore, Yamazaki '317 and Zhang do

not teach or suggest a concentration of a crystallization promotion material of less than $5x^{16}$ atoms/cm^3." The Examiner notes that $1x10^{17}$ cm^{-3} (i.e. – the concentration needed to promote crystallization as stated by Zhang) multiplied by ½ (or less) (noting paragraph 29 of '317) provides a value of $5x10^{16}$ atoms/cm^3 (or less) in the channel region. Hence, the teachings of the prior art meet the limitations of Claim 42.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (571) 272-1691. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone

number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dh

ERIK J. KIELIN
PRIMARY EXAMINER